Re Point V

1. The following documents (D) cited in the search report are named in this Action; the numbering is also retained in the further proceedings:

   D1: DE-A-19912414

   D2: XP002257410 Script: Introduction to Physics I (0000), 1-8

   D3: DE-A-4213883

2. Document D1 (see especially Abstract; column 3, lines 23 through 43; column 4, lines 6 through 30; column 5, lines 53 through 60) discloses, in agreement with **some** features of **Claim 1**, a method for verifying the connection-related communications data registered by a network node (see especially the Abstract or column 4, lines 6 - 30; Figure 1), which are used for calculating the charges, in which at least one predetermined test communications connection is established and cleared again via at least this network node (see "20" in Figure 1 or the Abstract); the time of an event required for calculating the charges ("start time": column 3, lines 23 - 28) is registered at a predetermined measuring point ("32" in Figure 1) and in the network node ("20" in Figure 1);
   the time of at least one additional event required for calculating the charges is registered at the predetermined measuring point or at at least one additional predetermined measuring point and in the network node ("end time": column 3, lines 23 - 28), the measuring points lying outside of the network node (see "32" in Figure 1 in conjunction with column 4, lines 9 - 13);
   a reference data record is produced, which contains time-

related data that are generated from the events registered at the measuring point or measuring points (production of reference data record: see e.g. column 4, lines 15 - 20);
at least one connection-related communications data record is produced in the network node, which contains time-related data that describe the events registered in the network node (production of communications data record, see e.g. column 4, lines 20 -24);
the reference data record is compared to the at least one communications data record (comparison of data records: see column 4, lines 24 - 27; column 6, lines 61 - 65);
and a determination is made as to whether the difference between the time-related data of the communications data record and of the reference data record lies within a predetermined range (determining whether the temporal deviation lies within a tolerance, see e.g. column 6, line 66 to column 7, line 5).
The subject matter of present Claim 1 differs from the disclosure of D1 in that:

- the systematic temporal measuring error between the location of the occurrence of an actual event and the registration of the event at the respective predetermined measuring point is ascertained;
- the time-related data of the reference data record are corrected by the ascertained systematic temporal measuring error.

The technical effect of these differentiating steps is the consideration of the systematic temporal errors of the measuring system, which occur (particularly due to propagation times and/or the digital processing in the call simulator) between the external location of the

occurrence of an actual event and its registration at the predetermined measuring point in the switching exchange. The consideration of this technical effect serves to increase the precision in the determination of time-related data of a reference data set, which is drawn upon for the purpose of validating charge data records of a switching exchange.

D1 further discloses (see column 3, lines 23 through 41) that, in spite of the clock calibration of the systems before the measurement, due to the possibly different manufacturer-specific digital registration (particularly due to different rounding-off methods) a deviation of the time stamps may result in the different systems, which the evaluation device is able to take into account with the aid of a specifiable temporal tolerance range, e.g. 1 second. With reference to a charge calculation for the connection that is exact to the second, this tolerance in the registration of the time stamps would possibly be too great since in the worst case the tolerances could add up in the end result to 2 seconds. It is obvious to one skilled in the art that the validation of the switching exchange with reference to the tolerance of the registered temporal data concerns this aspect internal to the switching exchange, which is to be registered as neutrally as possible with respect to measuring errors.

Hence, as an objective technical problem, the provision of a measuring method of increased precision for validating the precision of a switching exchange to be tested with respect to the communications data records used for calculating the charges for a fee-based communications connection is formulated.

One skilled in the art knows from his broad general knowledge (see e.g. D2, paragraph 4) that a systematic, i.e. constant and test scenario-specific or construction-specific error generally occurs in measurements, which is to be ascertained to achieve higher precision and by which the measured result is to be corrected.

For this purpose, one skilled in the art would seek to keep the distance between the location of the occurrence of an actual event and the respective predetermined measuring point as small as possible. Since this is not always possible in digital switching exchanges, due to constraints of construction and location, and since there is possibly routing through additional switching systems, one skilled in the art would, in order to measure the delay of the switching exchange to be validated as correctly as possible, alternatively seek to make the measuring method independent of this external factor.

Starting from the method known from document D1 and using his general expert knowledge (see D2), it would hence be obvious to one skilled in the art to transfer the generally known principle (of correcting a measured value by a systematic measuring error of the measuring system) to the method described in document D1 in order to solve the above-mentioned problem.

To this end, one skilled in the art would in an obvious manner first determine the systematic measuring error of the measuring system so as then to use this to correct the temporal data of the reference data record.
Using the thus corrected temporal data of the reference data record, one skilled in the art would then perform the validation of the data record of the switching exchange

Hence, without inventive activity, one skilled in the art would arrive at the method according to the subject matter of Claim 1.

Therefore, the subject matter of Claim 1 is **not inventive** (Article 33(3) PCT).

2. The same objection, which was made in the above section with respect to Claim 1, also applies to Claim 10 since the subject matter according to **Claim 10** rests on the same basic principle as the method according to Claim 1.

Therefore, the subject matter of present **Claim 10** likewise reveals no inventive activity **(Article 33(3) PCT)**.

3. The additional features specified by the dependent **Claims 2 - 9 and 11 - 13** are either essentially known from **D1** (for **Claims 3 and 12: "IUT" or "20" in Figure 1**) or **D3** (for **Claims 4, 5 and 13**: synchronization to standard time via DCF77 interface) or they lie within the scope of normal expert activity (for **Claims 2, 6 - 9 and 11**: obvious selection of different test scenarios with different events) such that the dependent **Claims 2 - 9 and 11 - 13** are not based on an inventive activity and hence do not fulfill the requirements of **PCT Article 33 (3)**.

System And Method For Verifying The Connection-Related Communications Data Registered By A Network Node

The present invention relates to a system and a method for verifying the connection-related communications data registered by a network node, particularly by a switching network node of a telecommunications network, which are used for calculating charges.

An essential performance characteristic of switching exchanges in a telecommunications network is the registration of charge data accumulated during a connection as well as in the use of a service. For this purpose, all communications data required for calculating the charges must be registered for every communications connection in the switching exchange. Appropriate test systems are needed to verify the accuracy of the communications data registration.

Such a test system is known from DE 199 12 414 A1, for example, **which constitutes the preamble of the independent Claims 1 and 10**. This test system, however, suffers from the fact that time-related events such as the start of a connection and the end of a connection can be registered only in an imprecise manner. Consequently, these methods are not suited to verify whether the narrow tolerance limits specified for the registration of charge data are maintained.

Script XP 002257410 Introduction to Physics I (0000) discusses, among other things, measuring errors. Every measuring result is impaired by random and systematic errors, systematic errors being determined by the reading accuracy and the calibration precision of a measuring device.

The objective of the present invention now is to provide a system and a method with which it is possible to verify the

correctness of the communications data records provided by a network node even when the registration precision

What Is Claimed Is:

1. A method for verifying the connection-related communications data registered by a network node, which are used for the calculation of charges, in which:
at least one predetermined test communications connection is established and cleared again via at least this network node;
the time of an event required for calculating the charges is registered at a predetermined measuring point and in the network node;
the time of at least one additional event required for calculating the charges is registered at the predetermined measuring point or at at least one additional predetermined measuring point and in the network node, the measuring points lying outside of the network node;
a reference data record is produced, which contains time-related data that are generated from the events registered at the measuring point or measuring points;
at least one connection-related communications data record is produced in the network node, which contains time-related data that describe the events registered in the network node;
the reference data record is compared to the at least one communications data record; and
a determination is made as to whether the difference between the time-related data of the communications data record and of the reference data record lies within a predetermined range;
wherein the systematic temporal measuring error between the location of the occurrence of an actual event and the registration of the event at the respective predetermined measuring point is ascertained and the time-related data

of the reference data record are corrected by the ascertained systematic temporal measuring error.

2. The method as recited in Claim 1, wherein the events represent the start and the end of the test communications connection and/or the start and the end of at least one service feature requested during the existing test communications connection.

3. The method as recited in Claim 1 or 2, wherein a switching network node is used as a network node.

4. The method as recited in one of Claims 1 through 3, wherein each measuring point is assigned in each case a system clock or a shared system clock, a calibration is performed between the system clocks and a time standard.

5. The method as recited in Claim 4, wherein the time difference ascertained between the system clock or system clocks and the time standard at the time of calibration is used for correcting the time-related data of the reference data record.

6. The method as recited in one of Claims 2 through 5, wherein the called subscriber of the test communications connection is chosen as the measuring point at which the start of the connection is to be registered and the subscriber who terminates the test communications connection is chosen as the measuring point at which the end of the connection is to be registered.

7. The method as recited in one of Claims 2 through 6, wherein the initiating subscriber of the use of the service feature is chosen as the measuring point at which the start of the use of a service feature requested

during an existing test communications connection is to be registered and the subscriber who terminates the use is chosen as the measuring point at which the end of the use of the service feature is to be registered.

8. The method as recited in one of Claims 2 through 7, wherein the time-related data of the reference data record include the duration of the connection, which is ascertained by the following steps:
a timer is started by the start of the connection registered at the measuring point and is stopped by the end of the connection registered at the or another measuring point.

9. The method as recited in one of Claims 2 through 8, wherein the time-related data of the reference data record include the duration of the use of at least one service feature requested during the test communications connection, which is ascertained by the following steps:
a timer is started by the start of the service feature registered at a measuring point and is stopped by the end of the use of the service feature registered at the or another measuring point.

10. A system for verifying the connection-related communications data registered by a network node, which are used for calculating charges, having at least one call simulator (60) connectible to the network node (20), having the following features:
at least one system clock (35, 45),
a device (30, 40) for establishing and clearing at least one predetermined test communications connection;
at least one device for producing predetermined events required for calculating charges;
at least one device for registering the times of at least

some of the events required for calculating charges, a device for generating a connection-related reference data record containing time-related data that describe the registered events; the network node (20) having:
a device for registering the times of at least some of the events required for calculating charges,
a system clock (25),
a device for generating at least one connection-related communications data record containing time-related data that describe the events registered in the network node;
a device (50) for comparing the reference data record to the at least one communications data record
and a device for determining whether the difference between the time-related data of the communications data record and the reference data record lies within a predetermined range,
characterized by a correction device assigned to the call simulator (60), in which a correction value is stored, which corresponds to the systematic temporal measuring error between the location of the occurrence of an actual event and the registering of this event at the registration device of the call simulator, the time-related data of the reference data record being corrected by the stored systematic temporal measuring error in the correction device.

11. The system as recited in Claim 10,
wherein the events represent the start and the end of a test communications connection and/or the start and the end of at least one service feature requested during the existing test communications connection.

12. The system as recited in Claim 10 or 11,
wherein the network node (20) is a switching network node.

13. The system as recited in one of Claims 10 through 12, wherein the system clocks (35, 45) of the call simulator (60) are in each case designed to receive a standard time, a calibration being performed between the system clocks and the standard time.